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EXAMINER	
CONNELLY CUSHWA, MICHELLE R	
ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/826,658	FU ET AL.	
	Examiner	Art Unit	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *12-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-11,16-20 and 23-28* is/are rejected.

7)☒ Claim(s) *5,21 and 22* is/are objected to.

8)☒ Claim(s) *1-28* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-11 and 16-28, drawn to a dispersion compensation module, classified in class 385, subclass 47.

II. Claims 12-14, drawn to a dispersion tolerant receiver, classified in class 398, subclass 212.

III. Claim 15, drawn to a wavelength tracking apparatus, classified in class 398, subclass 29.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product (MPEP § 806.04(b), 3rd paragraph), and the species are patentably distinct (MPEP § 806.04(h)). In the instant case, the intermediate product is deemed to be useful as a dispersion compensation module for any optical system/element, including transmitters and transceivers in addition to receivers, and the inventions are deemed patentably distinct since there is nothing on this record to show them to be obvious variants. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions anticipated by the prior art, the

evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Inventions III and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination of invention III does not require the particular dispersion compensation module of Invention I. The subcombination has separate utility such as a dispersion compensation module in any optical system/apparatus.

Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions the inventions have different functions, Invention II is a receiver module and Invention III is a wavelength tracking apparatus.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Brian Gustafson on December 29, 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11 and 16-28. Affirmation of this election must be made by applicant in

replying to this Office action. Claims 12-15 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
It does not identify the citizenship of each inventor.

The citizenship of the first inventor listed on page 3 of the Declaration has been deleted.

Drawings

Thirteen (13) sheets of formal drawings were filed on April 15, 20004 and have been considered by the Examiner.

Specification

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claim 16 is objected to because of the following informalities: "part" in line 7 and in line 13 of claim 16 should be –port--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 11; the claim recites the limitation "each polarizer quarter wave plate etalon assembly" in lines 5-6 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 20; the claim reads, "The dispersion compensation module of claim 16, wherein each reflection." This is not a complete sentence. Claim 20 is not comprehensible and has not been addressed with respect to prior art.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-11, 16-19 and 24-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Jain (US 2004/0190906 A1).

Regarding claim 1; Jain discloses a dispersion compensation module in Figure 5 (see paragraphs [0075]-[0077]), comprising:

- a polarizer (143A, see paragraph [0086]) having a first port, a second port, and a third port;
- a reflection etalon (145A; see paragraph [0089]); and
- a quarter waveplate (144A, see paragraph [0085]) positioned between the reflection etalon and the second port of the polarizer.

Regarding claim 2; the dispersion compensation module is operable to apply a group delay profile to at least one optical signal.

Regarding claim 3; the polarizer (143A) is operable to redirect a first optical signal having a first polarization (s) input at the first port to be output from the second port and to redirect a second optical signal having a second polarization (p) perpendicular to the first polarization input at the second port to be output at the third port.

Regarding claim 4; the reflection etalon (145A) is operable to apply a group delay profile to the first optical signal output from the second port.

Regarding claim 6; a polarization collimator (142) is coupled to the polarizer quarter wave plate etalon assembly.

Regarding claims 7, 9 and 10; Jain discloses that the resonant frequency (peak resonance) of the reflection etalons (MCGTRs) may be adjusted thermally, magneto-

optically, electro-optically, piezo-electrically, through angle tuning, or alternative means (see paragraphs [0095]-[0096]), and a tuner in the form of a heating element, magnetic element, electric element (electrodes), piezoelectric element, mechanical element, or alternative tuning element is inherently required to accomplish the adjustment.

Regarding claim 8; a controller is inherently coupled to the tuner and operable to control the tuner in order to adjust the refractive index thermally, magneto-optically, electro-optically, piezo-electrically, through angle tuning, or by alternative means as disclosed by Jain, wherein the controller may simply be an on/off switch or may have multiple settings.

Regarding claim 11; Jain discloses a dispersion compensation module for applying a desired group delay profile to at least one optical signal in Figure 5 (see paragraphs [0075]-[0077]), comprising:

- a plurality of etalon assemblies, each etalon assembly for applying a group delay profile to the at least one optical signal, each etalon assembly arranged so that at least one optical signal passes at least once therethrough, each polarizer quarter wave plate etalon assembly comprising:
    - a polarizer (143A, 143B) having a first port, a second port, and a third port, the polarizer for redirecting a first optical signal having a first polarization (s) input at the first port to be output from the second port, the polarizer for redirecting a second optical signal having a second polarization (p) perpendicular to the first

polarization input at the second port to be output at the third port;

- a reflection etalon (145A, 145C) arranged for application of a group delay profile to the first optical signal output from the second port; and
- a quarter-wave plate (144A, 144C) located between the reflection etalon and the polarizer, for rotating a polarization of the first optical signal output from the second port by 45 degrees and allowing the first optical signal to propagate toward the reflection etalon, the quarter-wave plate for rotating a polarization of an optical signal reflected back from the reflection etalon by a further 45 degrees into a second optical signal having a second polarization perpendicular to the first polarization and allowing the second optical signal to be input at the second port of the polarizer.

Regarding claim 16; Jain discloses a dispersion compensation module in Figure 5 (see paragraph [0075]-[0077]), comprising:

- an etalon assembly pair comprising:
  - a first etalon assembly including:
    - a first polarizer (143A) having a first port, a second port, and a third port;
    - a first reflection etalon (145A); and

- a first quarter wave-plate (144A) positioned between the reflection etalon and the second port of the polarizer; and

- a second etalon assembly including:
  - a second polarizer (143B) having a first port, a second port, and a third port;
  - a second reflection etalon (145C); and
  - a second quarter wave-plate (144C) positioned between the reflection etalon and the second port of the polarizer;

- wherein, the third port of the first polarizer is coupled to the third port of the second polarizer.

Regarding claim 17; the first polarizer (143A) is operable to redirect a first optical signal, having an initial polarization (s), input at the first port to be output from the second port and to redirect a second optical signal, having a polarization (p) perpendicular to the initial polarization, input at the second port to be output at the third port.

Regarding claim 18; the second polarizer is operable to redirect a first optical signal, having an initial polarization (s), input at the third port to be output from the second port and to redirect a second optical signal, having a polarization (p) perpendicular to the initial polarization, input at the second port to be output at the third port.

Regarding claim 19; the dispersion compensation module to operable to apply a group delay profile to at least one optical signal.

Regarding claims 24, 26 and 27; Jain discloses that the resonant frequency (peak resonance) of the reflection etalons (MCGTRs) may be adjusted thermally, magneto-optically, electro-optically, piezo-electrically, through angle tuning, or alternative means (see paragraphs [0095]-[0096]), and a tuner in the form of a heating element, magnetic element, electric element (electrodes), piezoelectric element, mechanical element, or alternative tuning element is inherently required to accomplish the adjustment.

Regarding claim 25; a controller is inherently coupled to the tuner and operable to control the tuner in order to adjust the refractive index thermally, magneto-optically, electro-optically, piezo-electrically, through angle tuning, or by alternative means as disclosed by Jain, wherein the controller may simply be an on/off switch or may have multiple settings.

Claims 1-4, 7-9, 11, 16-19 and 23-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Vakoc (US 6,804,057 B1).

Regarding claim 1; Vakoc discloses a dispersion compensation module in Figures 9 and 10 (see column 9, line 65, through column 11, line 15), comprising:

- a polarizer (950) having a first port, a second port, and a third port;
- a reflection etalon (910); and
- a quarter waveplate (λ4 Plate) positioned between the reflection etalon and the second port of the polarizer.

Regarding claim 2; the dispersion compensation module is operable to apply a group delay profile to at least one optical signal.

Regarding claim 3; the polarizer (950) is operable to redirect a first optical signal having a first polarization (TM) input at the first port to be output from the second port and to redirect a second optical signal having a second polarization (TE) perpendicular to the first polarization input at the second port to be output at the third port.

Regarding claim 4; the reflection etalon (910) is operable to apply a group delay profile to the first optical signal output from the second port.

Regarding claims 7 and 9; Vakoc discloses that the resonant frequency (peak resonance) of the reflection etalons (910-920) may be adjusted by a tuner (TEC/Heater).

Regarding claim 8; a controller is inherently coupled to the tuner/heater, wherein the controller may simply be an on/off switch or may have multiple settings.

Regarding claim 11; Vakoc discloses a dispersion compensation module for applying a desired group delay profile to at least one optical signal in Figures 9 and 10 (see column 9, line 65, through column 11, line 15), comprising:

- a plurality of etalon assemblies, each etalon assembly for applying a group delay profile to the at least one optical signal, each etalon assembly arranged so that at least one optical signal passes at least once therethrough, each polarizer quarter wave plate etalon assembly comprising:
    - a polarizer (950, 952, 954, 956, 958) having a first port, a second port, and a third port, the polarizer for redirecting a first optical signal having a first polarization (TM) input at the first

port to be output from the second port, the polarizer for redirecting a second optical signal having a second polarization (TE) perpendicular to the first polarization input at the second port to be output at the third port;

- a reflection etalon (910, 913, 915, 917, 919) arranged for application of a group delay profile to the first optical signal output from the second port; and
- a quarter-wave plate (λ4 Plate) located between the reflection etalon and the polarizer, for rotating a polarization of the first optical signal output from the second port by 45 degrees and allowing the first optical signal to propagate toward the reflection etalon, the quarter-wave plate for rotating a polarization of an optical signal reflected back from the reflection etalon by a further 45 degrees into a second optical signal having a second polarization perpendicular to the first polarization and allowing the second optical signal to be input at the second port of the polarizer.

Regarding claim 16; Vakoc discloses a dispersion compensation module in Figures 9 and 10 (see column 9, line 65, through column 11, line 15), comprising:

- an etalon assembly pair comprising:
  - a first etalon assembly including:

- a first polarizer (956) having a first port, a second port, and a third port;
- a first reflection etalon (917); and
- a first quarter wave-plate (λ4 Plate) positioned between the reflection etalon and the second port of the polarizer; and

o a second etalon assembly including:

- a second polarizer (958) having a first port, a second port, and a third port;
- a second reflection etalon (919); and
- a second quarter wave-plate (λ4 Plate) positioned between the reflection etalon and the second port of the polarizer;

- wherein, the third port of the first polarizer is coupled to the third port of the second polarizer.

Regarding claim 17; the first polarizer (956) is operable to redirect a first optical signal, having an initial polarization (TM), input at the first port to be output from the second port and to redirect a second optical signal, having a polarization (TE) perpendicular to the initial polarization, input at the second port to be output at the third port.

Regarding claim 18; the second polarizer is operable to redirect a first optical signal, having an initial polarization (TM), input at the third port to be output from the

second port and to redirect a second optical signal, having a polarization (TE) perpendicular to the initial polarization, input at the second port to be output at the third port.

Regarding claim 19; the dispersion compensation module to operable to apply a group delay profile to at least one optical signal.

Regarding claim 23; a reflector (1026) is coupled to the second etalon assembly in Figure 10.

Regarding claims 24, 26 and 27; Vakoc discloses that the resonant frequency (peak resonance) of the reflection etalons may be adjusted by tuner (TEC/heater).

Regarding claim 25; a controller is inherently coupled to the tuner, wherein the controller may simply be an on/off switch or may have multiple settings.

Regarding claim 28; Figure 9 and 10 of Vakoc each disclose a plurality of etalon assembly pairs, wherein a first port of each etalon assembly pair is coupled to a first port of another etalon assembly pair such that an optical signal can be directed to input at a first port of a first etalon assembly pair of the plurality of etalon assembly pairs and output at a first port of a last etalon assembly pair of the plurality of etalon assembly pairs.

Allowable Subject Matter

Claims 5, 21 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art cited on attached form PTO-892 is the most relevant prior art known, however, the invention of claims 5, 21 and 22 distinguishes over the prior art of record for the following reasons.

Regarding claims 5 and 21; the claims are allowable over the prior art of record because none of the references either alone or in combination disclose or render obvious a dispersion compensation module as defined in claim 5 or as defined in claim 21, wherein each polarizer is operable to rotate an initial polarization of an optical signal output from a second port by 45 degrees and allow the optical signal to propagate toward each reflection etalon, the quarter waveplate for rotating a polarization of an optical signal reflected back form the reflection etalon by a further 45 degrees into an optical signal having a polarization perpendicular to the initial polarization and allowing the optical signal to be input at a same second port of each polarizer in combination with the limitations of the base claims.

Regarding claim 22; the claim is allowable over the prior art of record because none of the references either alone or in combination disclose or render obvious a dispersion compensation module as defined in claim 22, comprising a single polarization controller coupled to port one of each polarizer in combination with the base claim.

Hence, there is no reason or motivation for one of ordinary skill in the art to use the prior art of record to make the invention of claims 5, 21 and 22.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Campbell et al. (US 2004/0004764 A1) discloses a chromatic dispersion compensator having a quarter wave-plate located between a polarizer and an etalon; and Colbourne et al. (US 6,804,467 B2) discloses a dispersion compensator having a quarter wave-plate located between a polarizer and an etalon (see the entire disclosure of each reference).

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

Michelle R. Connelly-Cushwa

Michelle R. Connelly-Cushwa
Patent Examiner
January 5, 2005